This listing of claims will replace the originally filed claims in the application.

Listing of Claims

Claims 1 – 12 (canceled).

Claim 13 (new): A process for producing a krypton/xenon mixture from air, comprising:

(a) introducing inlet air to at least one air distillation apparatus,

(b) distilling said air in said air distillation apparatus, thereby producing a stream of liquid oxygen, wherein said liquid oxygen contains most of the krypton and xenon present in said inlet air,

(c) vaporizing said liquid oxygen stream,

(d) introducing at least one hydrocarbon stream to said vaporized oxygen stream,

(e) partially oxidizing said hydrocarbon stream in the presence of at least a portion of said vaporized oxygen,

(f) producing a syngas containing a maximum of 0.1 ppm mol of oxygen; and

(g) removing constituents other than said krypton and said xenon from said syngas.

Claim 14 (new): The process according to Claim 13, wherein said partial oxidation is carried out by reacting said oxygen with an excess of said hydrocarbons.

Claim 15 (new): The process according to claim 14, further comprising the presence of steam during said partial oxidation.

Claim 16 (new): The process according to Claim 13, wherein said hydrocarbon stream comprises of one ore more of natural gas, methane, naphtha, or coal.

Claim 17 (new): The process according to Claim 13, wherein step (g) further comprises a dessication/decarbonation step followed by a cryogenic separation.

Claim 18 (new): The process according to Claim 17, wherein said cryogenic separation produces one or more of the following:

- a krypton/xenon-enriched stream,
- a methane and carbon monoxide stream,
- a hydrogen stream,
- a carbon monoxide stream, and
- a waste stream.

Claim 19 (new): The process according to Claim 18, wherein said cryogenic separation comprises:

i. introducing liquid carbon monoxide into the top of a first column,
ii. expanding the bottom liquid from said first column, thereby creating a first expanded bottom liquid,
iii. removing the hydrogen from a second column that is fed at the top with said first expanded bottom liquid,
iv. expanding the bottom liquid from said second column, thereby creating a second expanded bottom liquid,
v. injecting said second expanded bottom liquid into a low-pressure column fed at the top with liquid carbon monoxide, and
vi. producing a top stream, comprising carbon monoxide, and a bottom stream comprising said krypton/xenon-enriched stream.

Claim 20 (new): The process according to Claim 19, wherein said cryogenic separation is further comprised of:

vii. warming said krypton/xenon-enriched stream, and
viii. separating said krypton and said xenon from the other stream constituents, by means of a second cryogenic separation process.

Claim 21 (new): An apparatus for producing a krypton/xenon mixture from air, comprising:

- an air distillation apparatus that produces a liquid oxygen stream, wherein said liquid oxygen contains most of the krypton and xenon from the inlet air,
- a reboiler, wherein said reboiler is combined with said air distillation apparatus to vaporize said liquid oxygen stream,
- a partial oxidation reactor, wherein said reactor is fed by at least one of said vaporized oxygen stream or a gas that contains at least one hydrocarbon, said reactor producing a syngas containing a maximum of 0.1 ppm mol of oxygen; and
- a means for removing constituents other than krypton and xenon from said syngas.

Claim 22 (new): The apparatus according to Claim 21, wherein said removal means comprises a dessication/decarbonation mean followed by a cryogenic separation unit.

Claim 23 (new): The apparatus according to Claim 22, wherein said cryogenic separation unit comprises a combination of columns suitable for producing a krypton/xenon-enriched stream containing one or more of a methane and carbon monoxide mixture, a hydrogen stream, a carbon monoxide stream or a waste stream.

Claim 24 (new): The apparatus according to Claim 22, wherein said cryogenic separation unit comprises:

- a first column,
- a means for sending liquid carbon monoxide into the top of said first column,
- a means for expanding the bottom liquid from said first column,
- a second column for removing hydrogen, said second column being fed at the top with said expanded bottom liquid,
- a means for expanding the bottom liquid from said second column, and
- a low-pressure column fed at an intermediate level with said expanded bottom liquid from said second column and at the top with liquid carbon monoxide, said low-pressure column producing a top stream comprising

carbon monoxide and a bottom stream comprising said krypton/xenon-enriched stream.

Claim 25 (new): The apparatus according to Claim 24, wherein said cryogenic separation unit further comprises a column for separating said krypton and said xenon from said other constituents of said stream.